

Lab: Candy Chromatography

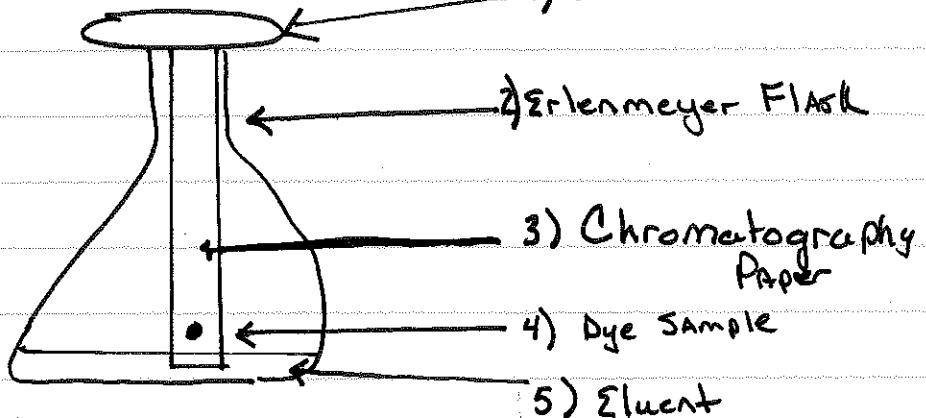
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AP Chem - Unit 7 - Imp

Prelab

Pre Lab

1)



A) Erlenmeyer FLASK - common glassware used in lab.

- Eluent - Known as the mobile phase (solvent).

The eluent carries the Analyte up the chromatography paper & separates it depending on the intermolecular forces btwn it & the sample

Chromatography paper - this is the Absorbent; a solid material that will attract & adsorb the materials to be separated

watch Glass - common Glassware used in lab

Dye Sample - the Analyte in this experiment

B) If the Eluent level is too high, the samples will dilute into the Solvent & render the adsorbent & sample marker unusable.

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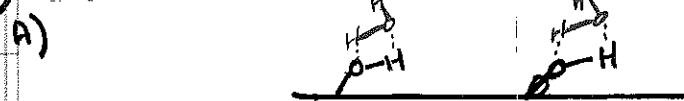
c) The flask was covered with a watch glass to prevent eluent evaporation since some eluents have a boiling pt near room temperature.

In some Chromatography experiments, a mixture of 2 solvents are used. (example ethyl ether + acetone).

Leaving the experiment set-up open to the air may result in evaporation of ether in this mixture since it has a lower Boilingpt, therefore changing the eluent concentration

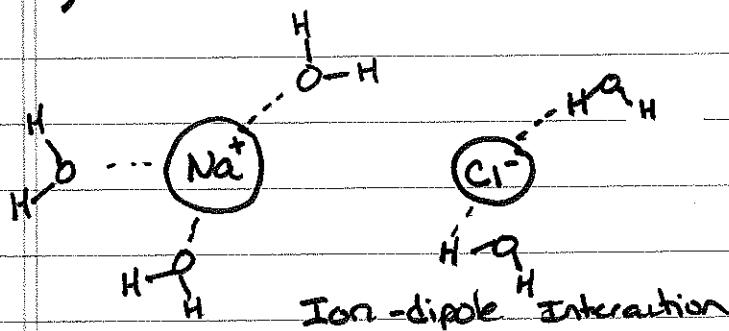
d) marking the line where the solvent traveled is important because it is measured in cm & used to calculate the R_f value of the Chromatogram. Also it must be done right away because if the paper dries you will not be able to see the solvent front

2) hydrophilic - Attracted to water

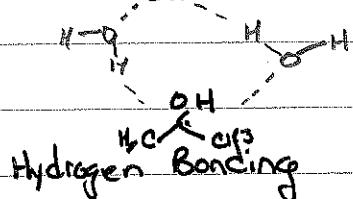


Cellulose fiber surface

b) Sodium Chloride in H₂O



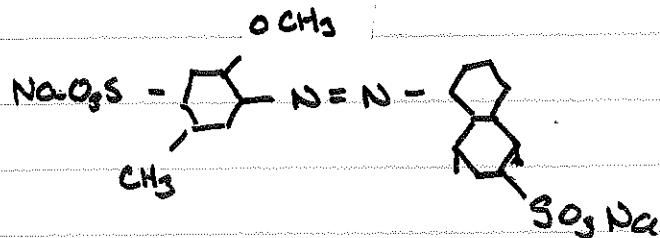
Isopropyl alcohol in H₂O



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- c) Intermolecular attractions for FD & C Red 40 molecule with NaCl soln & Isopropyl alcohol



NaCl soln has Na^+ & Cl^- ions

Ion-dipole interaction with the NaO_3S group

Isopropyl Alcohol soln: has OH α^- α^+ Polar molecule (small amount)

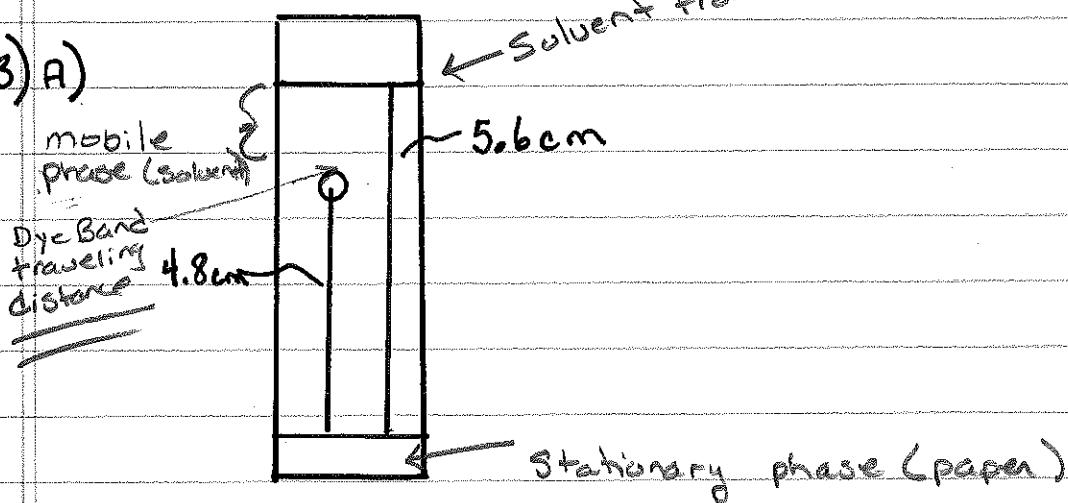
Ion-dipole Interaction with NaO_3S group

Also Red 40 is a large organic molecule with significant nonpolar rings & groups. These nonpolar regions interact with relatively nonpolar Isopropyl alcohol molecules & thus a greater affinity for this solvent than for either the NaCl soln or hydrophilic paper

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3) A)



B)

$$R_f = \frac{\text{distance traveled by sample}}{\text{distance traveled by solvent}} = \frac{4.8}{5.6}$$

$$R_f = 0.86$$

C) d by sample 2.8cm $R_f = \frac{2.8\text{cm}}{5.6\text{cm}} = 0.50$

Based on smaller R_f value, the dye analyzed in this experiment has a stronger attraction for the paper than the eluent, this is why traveled shorter distance.

D) If student witnessed 2 dye Bands on the chromatogram, this means this dye sample is a mixture of at least 2 dyes.

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- 4) A) If a Black marker was used instead of pencil as a sample marker, the eluent (solvent) would start separating the Black marker into its many dyes. Black markers are composed of many different color inks (dyes)
 - B) If filter paper was used instead of Chromatography paper, the experiment would still work due to the hydrophilic nature of its composition.
- 5) The 0.5% NaCl soln was the more optimal Solvent, compared to the other two, because the dyes traveled farther on the paper & there were greater distances separating the dye bands.